Plug Simulation Tuning Update

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Simulation Group Meeting
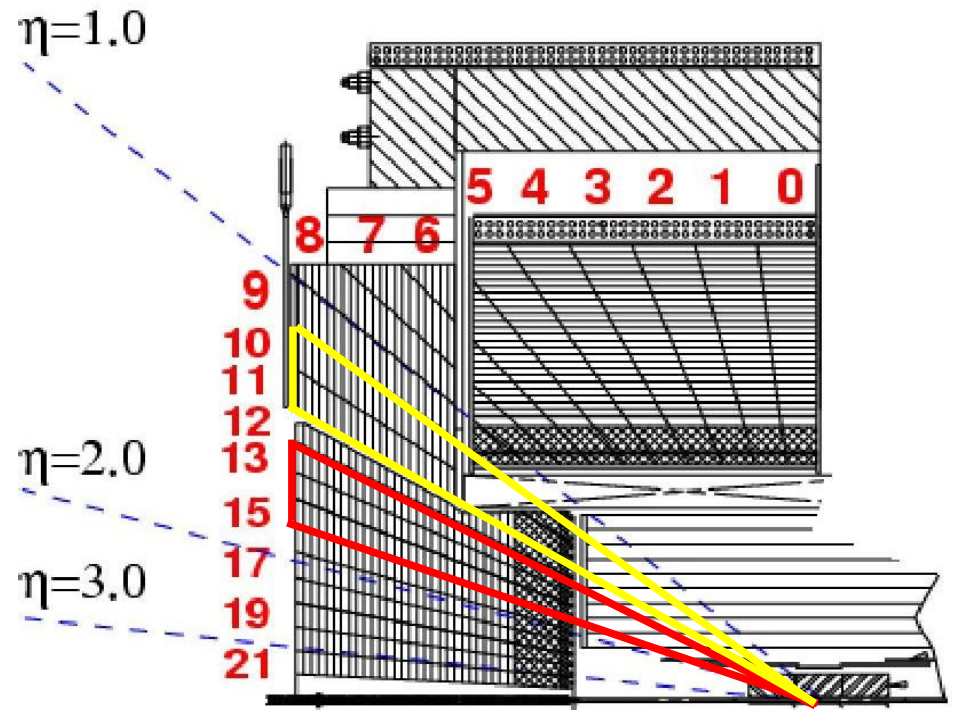Sep. 21st, 2006

Overview

Absolute $\langle E/p \rangle$ response tuning:

- Plug = towers 13-15

- Crack = towers 10,11

- Data sets used: gmbs0d & gjtc0d
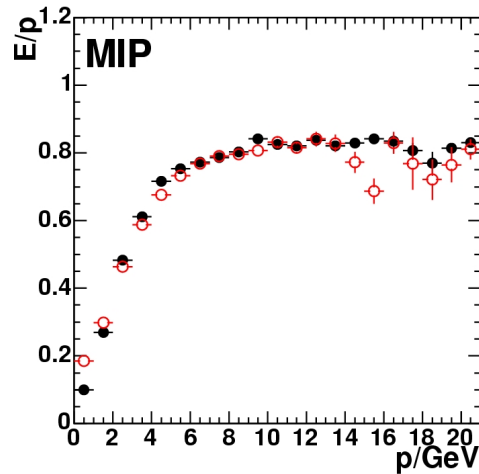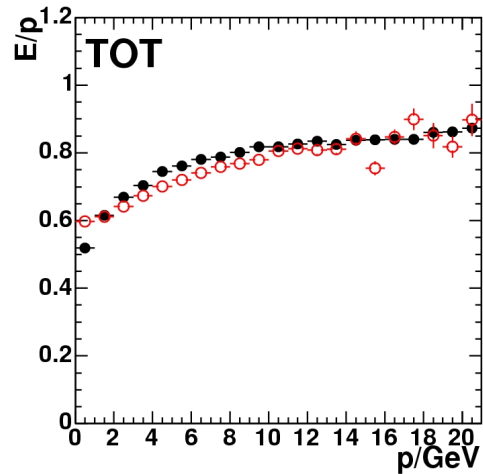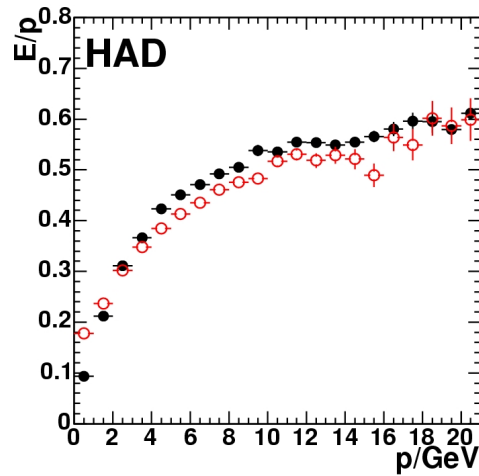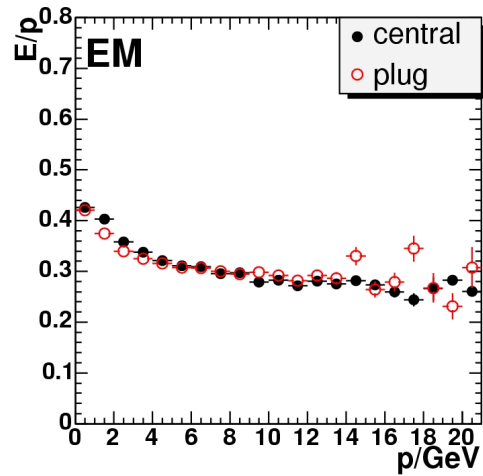
- Focus on IO track response

- $\langle E/p \rangle$ measurement procedure:

  ▶ background correction individually for each data set

  ▶ combination using weighted means
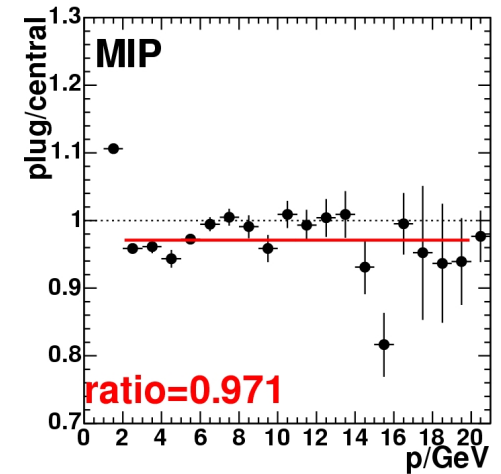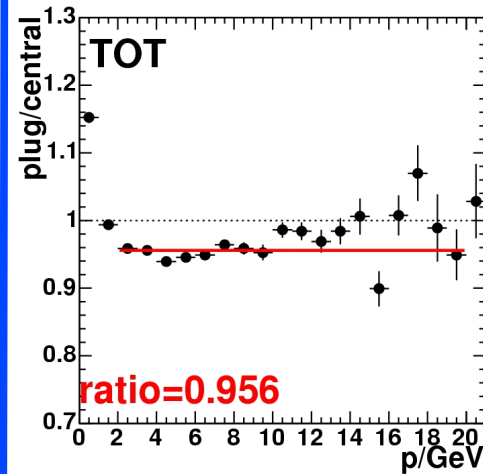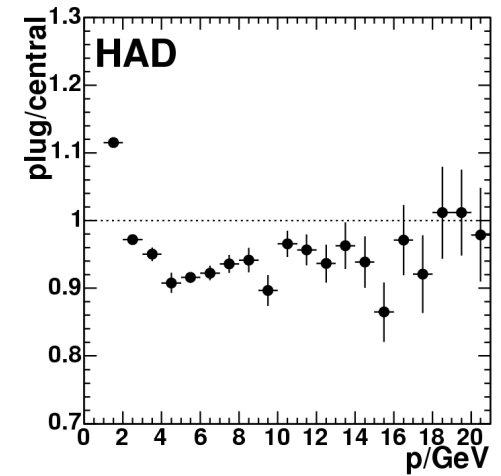
  ▶ p<10GeV/c: simple means

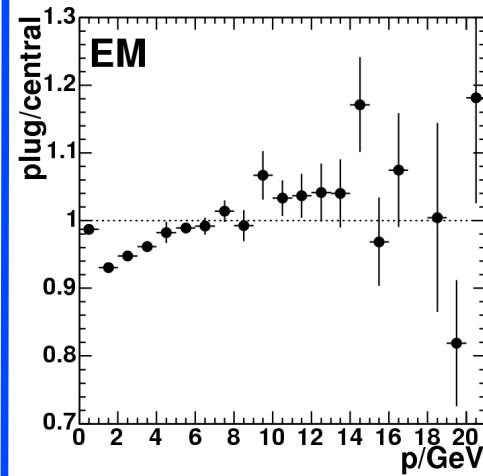 ▶ p>10GeV/c: Gaussians
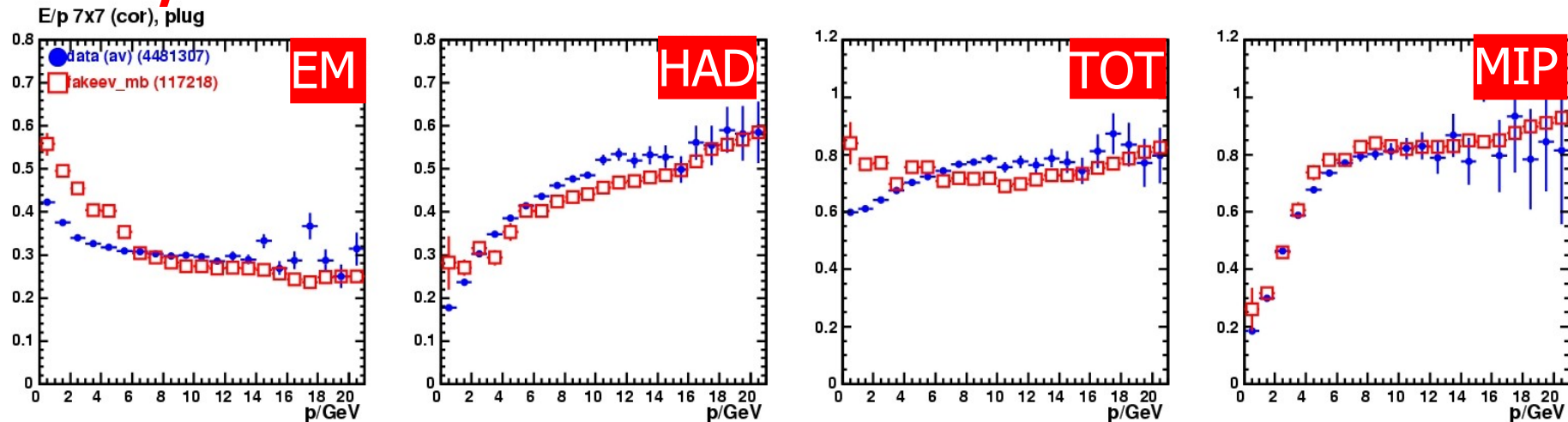
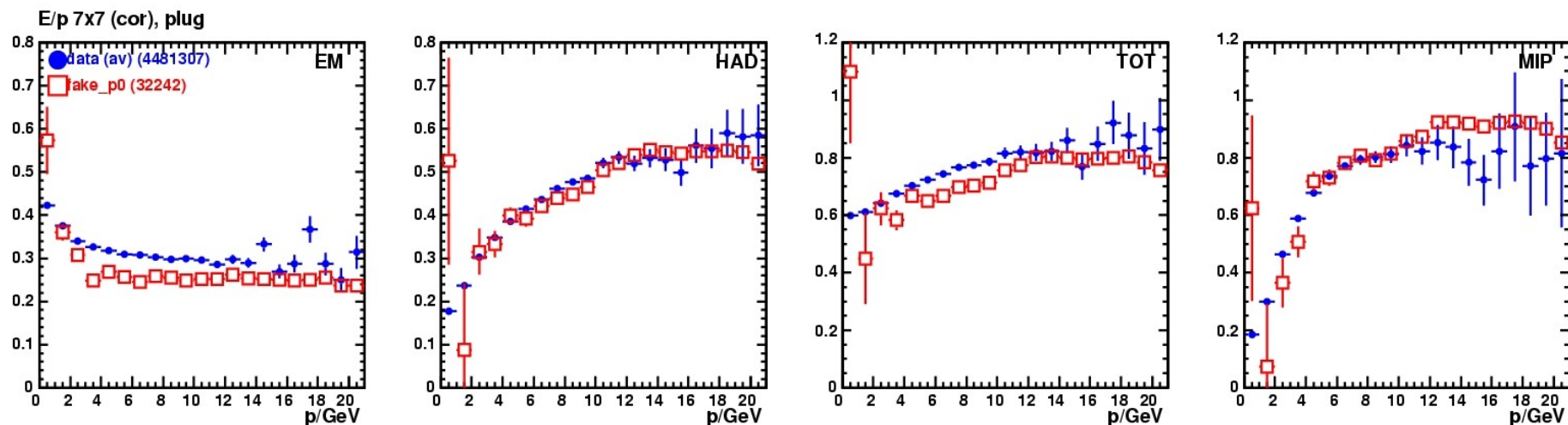# E/p Data

Plug vs. Central

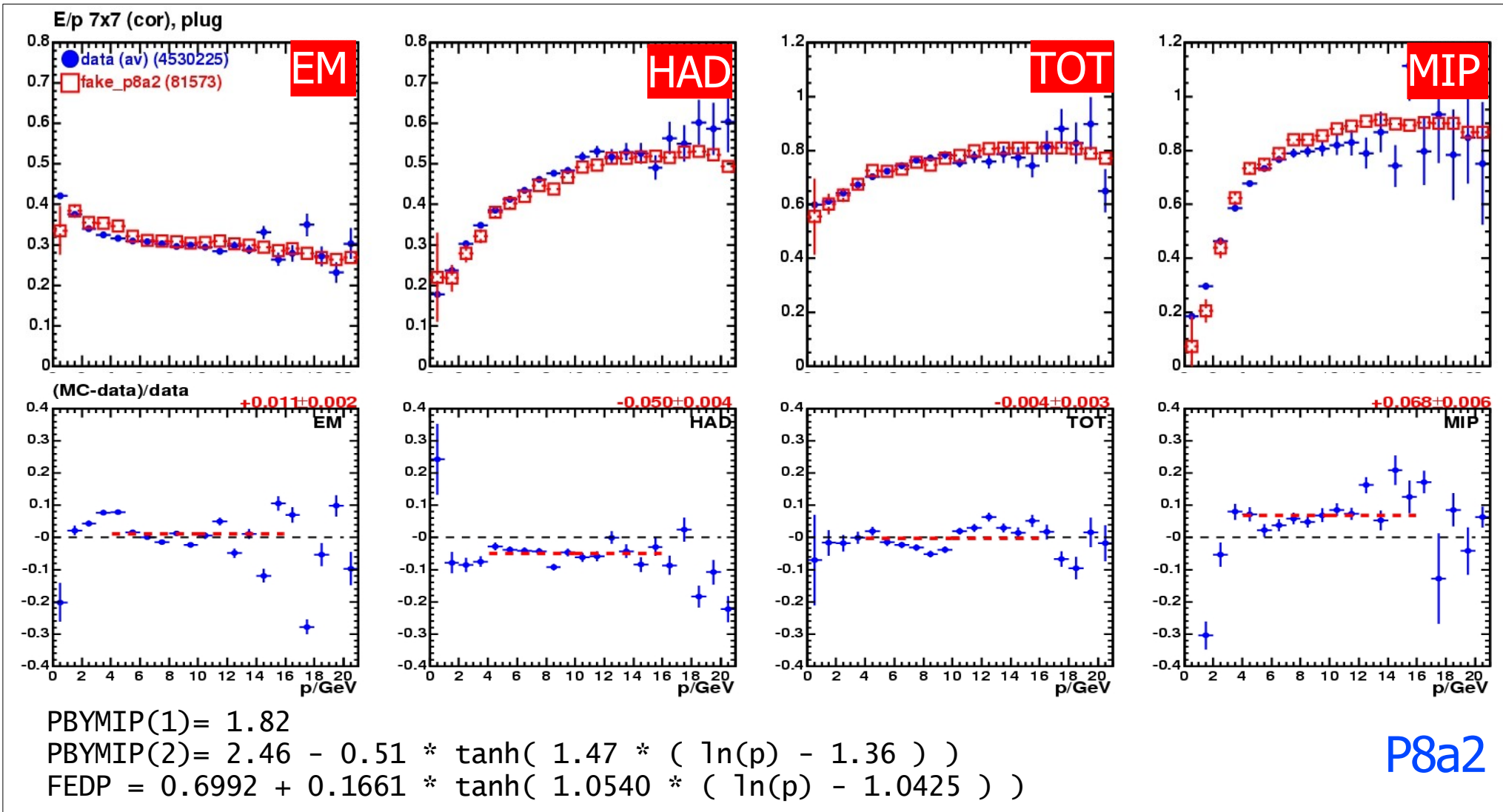## Ratio

Starting Point

Gen-5/6:

Starting point: take FEDP from Gen-5/6 and set relative sampling fractions back to values from test beam tuning:
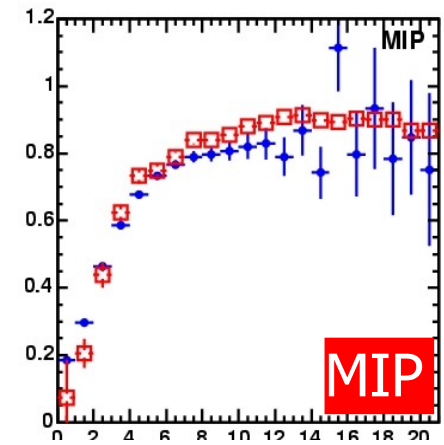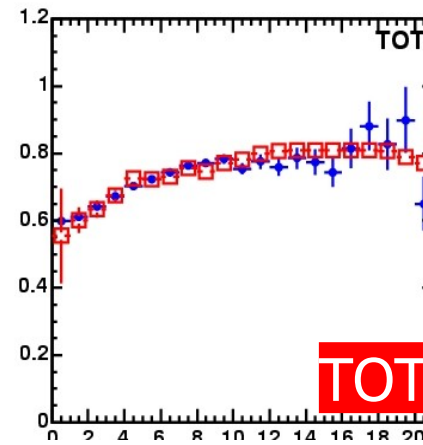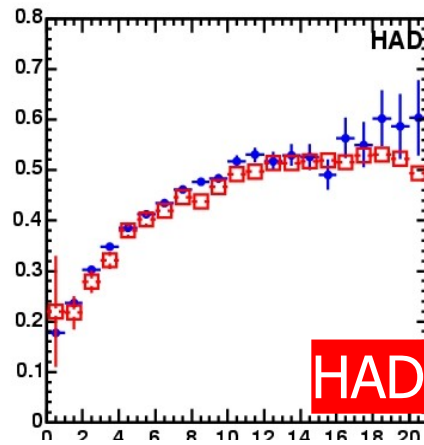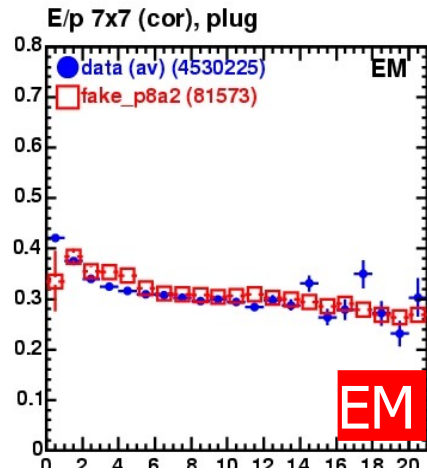

- "P series" starts with adjusting FEDP.
- "Q series" starts with adjustment of EM sampling fractions.

Latest P Series Results (Plug)

PBYMIP(1)= 1.82
PBYMIP(2)= 2.46 - 0.51 * tanh(1.47 * (ln(p) - 1.36))
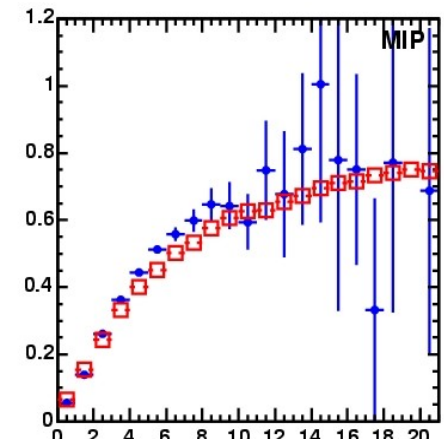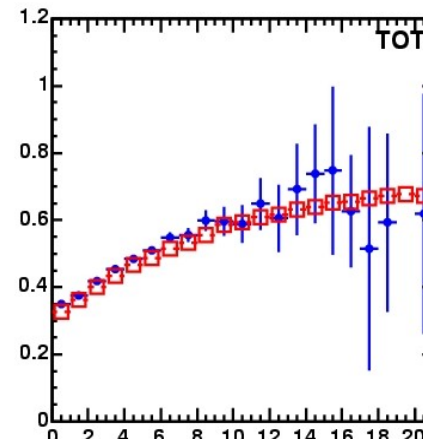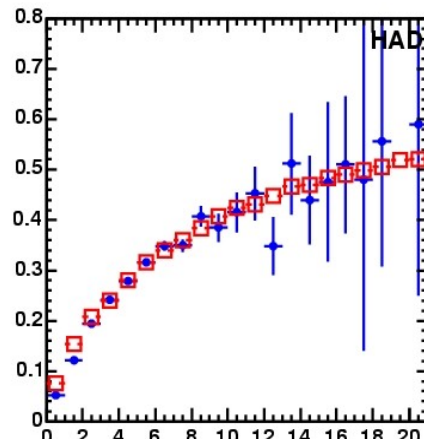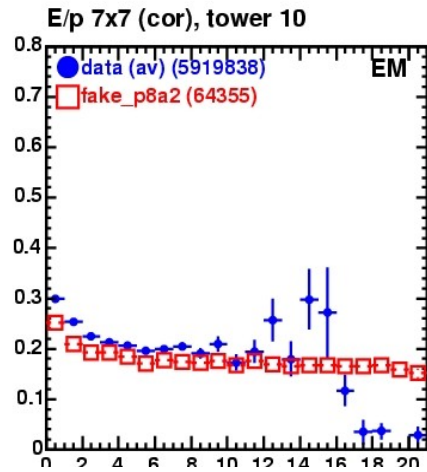FEDP = 0.6992 + 0.1661 * tanh(1.0540 * (ln(p) - 1.0425))

P8a2

- Control of MIP response difficult, requires variation of PBYMIP(2) between ~2.9 (low p) and ~2.0 (high p); test beam value (57GeV) is 3.20... ...no physical motivation for existence of three plateaus
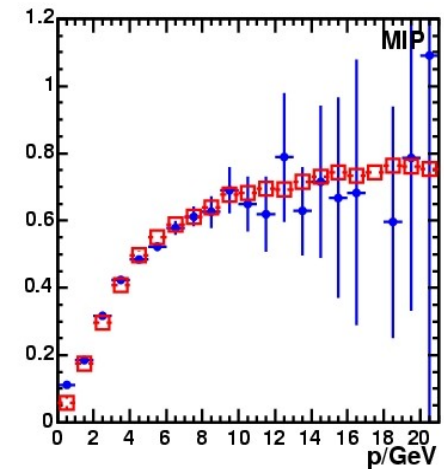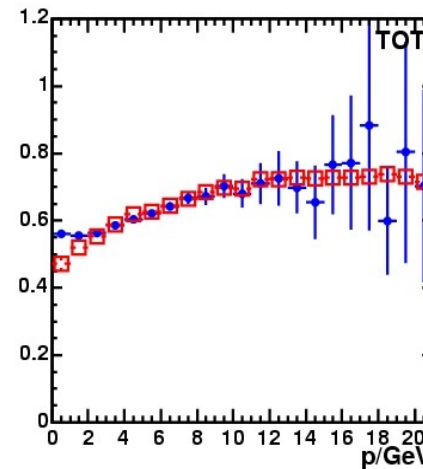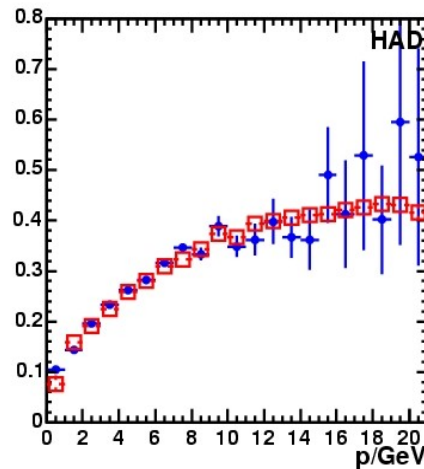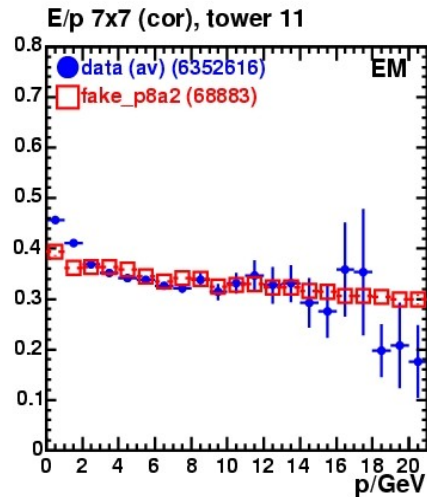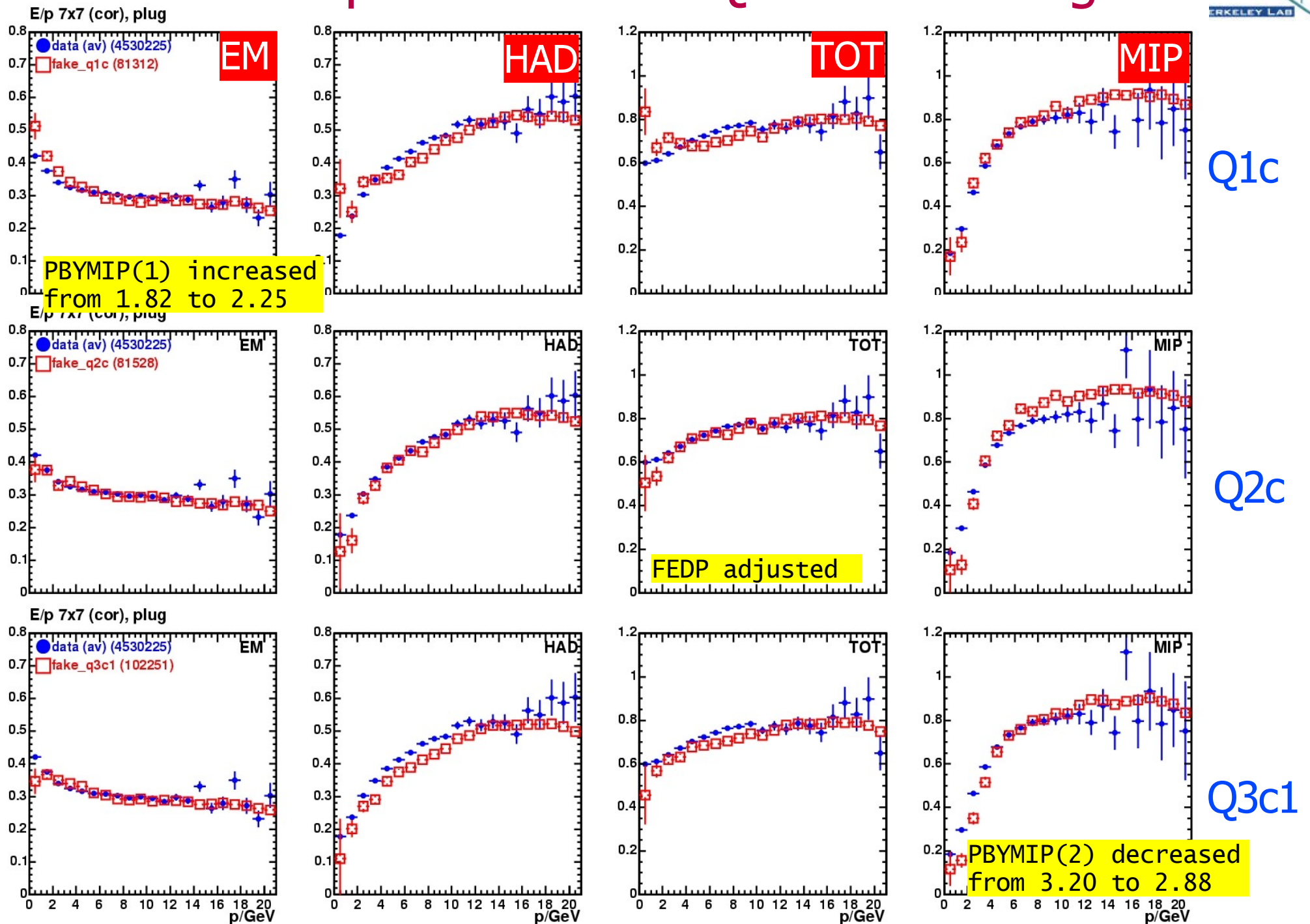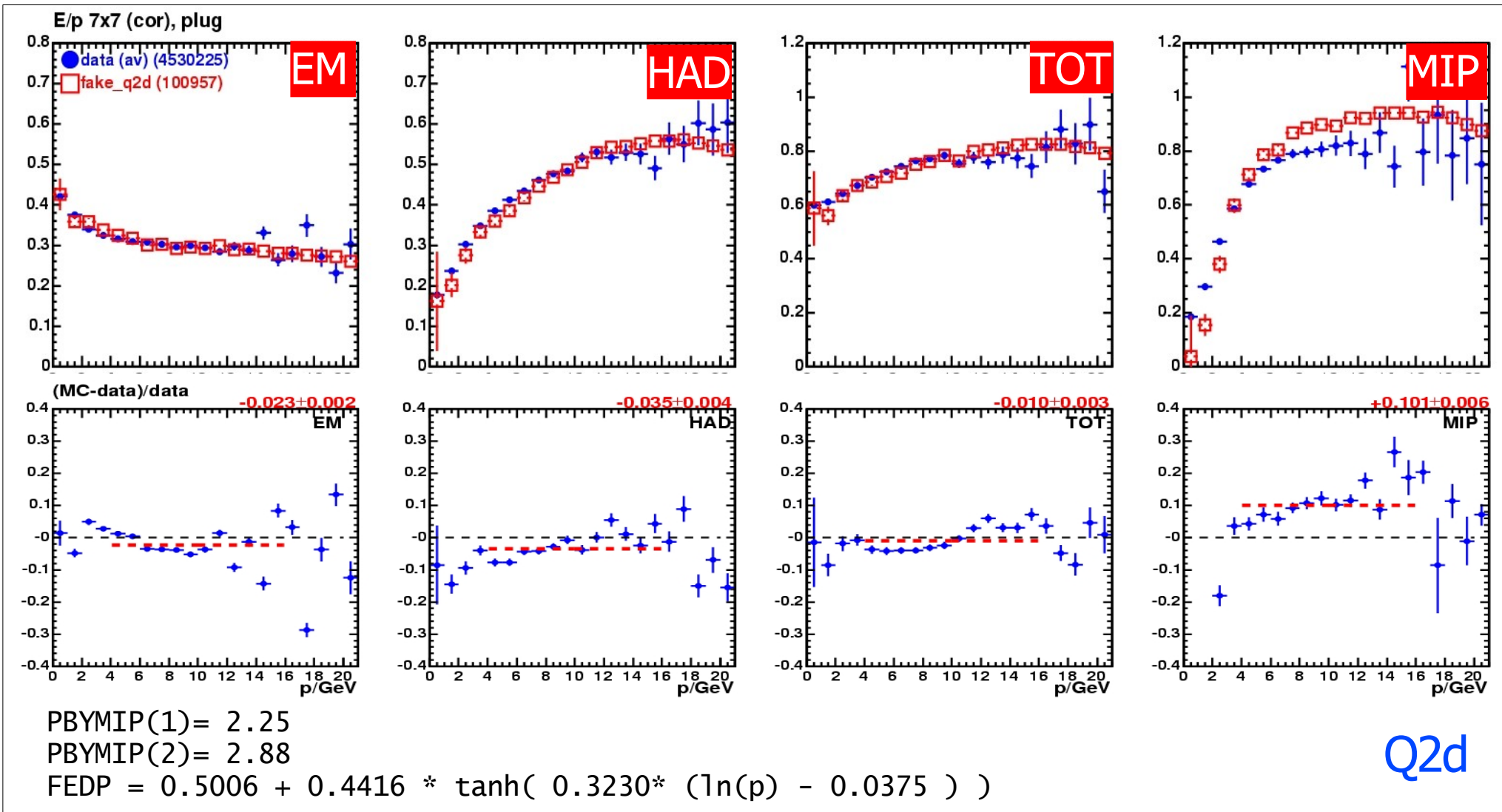- We discard the series although E/p agreement reasonable and improvable.

Plug vs. Crack (P Series)

Dec. 21st, 2006

Example Branch for Q Series Tuning

E/p 7x7 (cor), plug

EM — HAD — TOT — MIP

data (av) (4530225)
fake_q1c (81312)

PBYMIP(1) increased from 1.82 to 2.25

Q1c

E/p 7x7 (cor), plug

data (av) (4530225)
fake_q2c (81528)

EM — HAD — TOT — MIP

FEDP adjusted

Q2c

E/p 7x7 (cor), plug

data (av) (4530225)
fake_q3c1 (102251)

EM — HAD — TOT — MIP

PBYMIP(2) decreased from 3.20 to 2.88

Q3c1

p/GeV

Q Series Snapshot (Plug)

PBYMIP(1)= 2.25
PBYMIP(2)= 2.88
FEDP = 0.5006 + 0.4416 * tanh(0.3230* (ln(p) - 0.0375))

Q2d

- Q series seems to be an easier approach with better convergence.
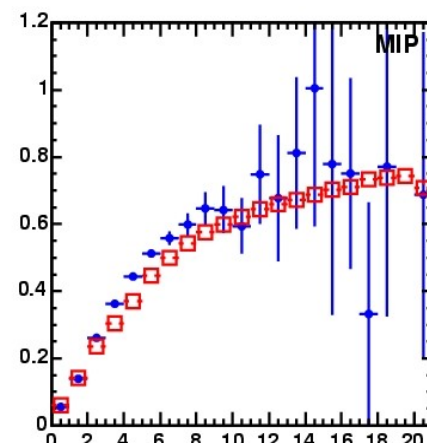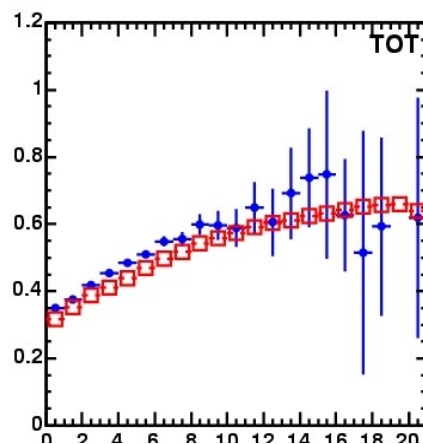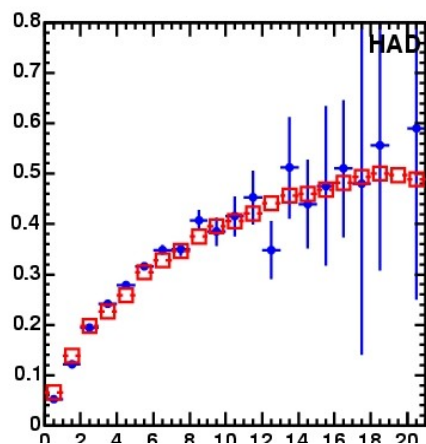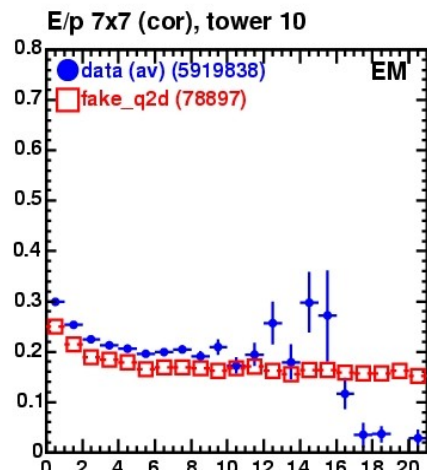- More "natural" parameter values closer to test beam tuning.
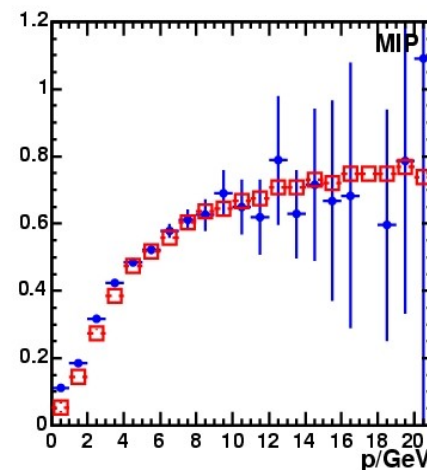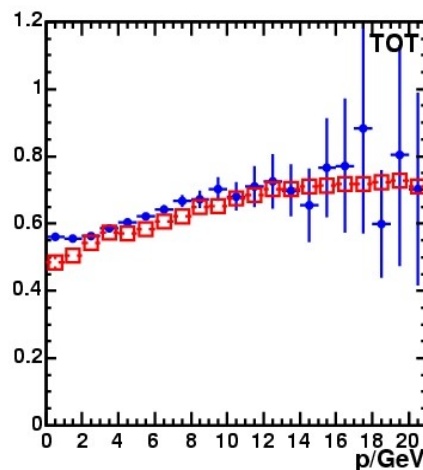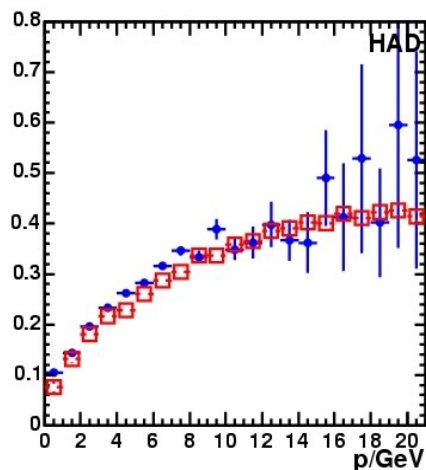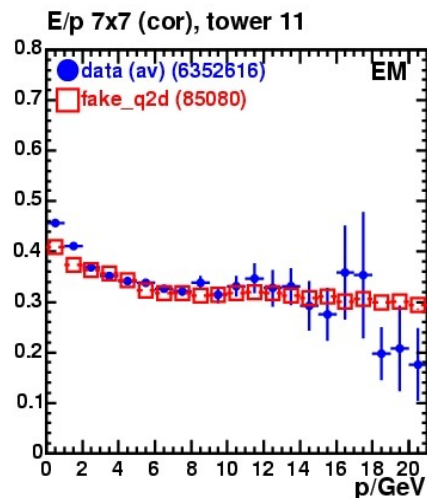- Only few iterations more to get final result...

Plug vs. Crack (Q series)
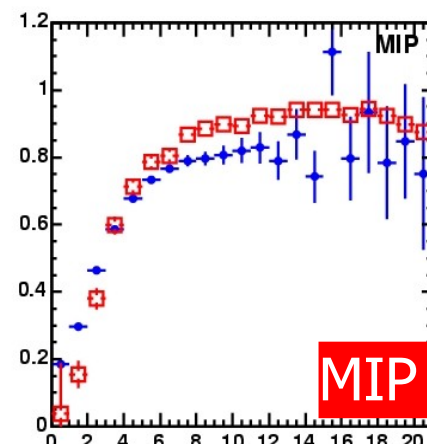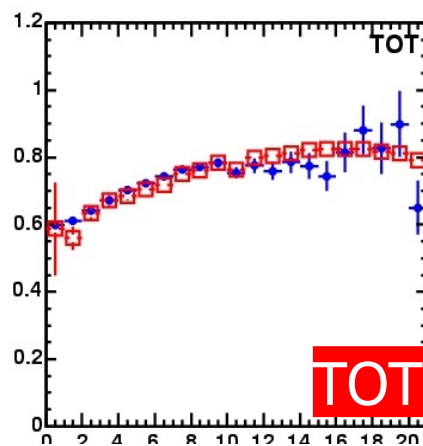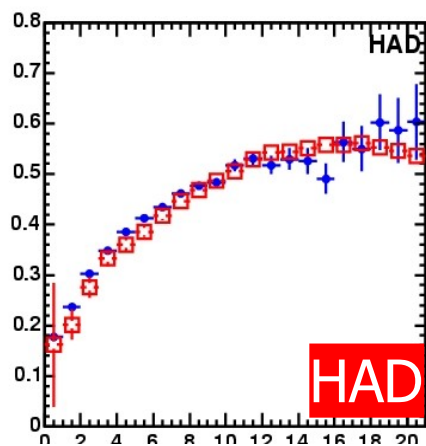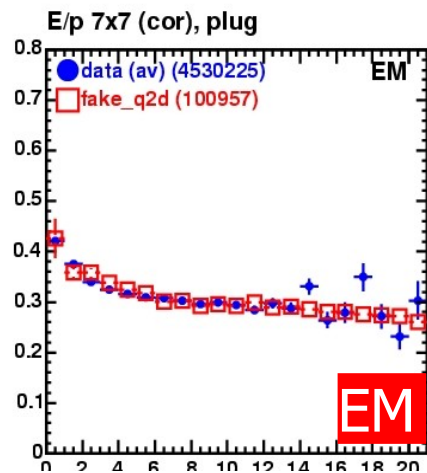
Conclusions

- There exist more than one tuning solution. We want to choose "politically correct" parameters for Gen-7.

- First tuning series discarded because of ugly energy dependence of the HAD relative sampling fractions.

- The new tuning series (started this week) are more promising because it is easier to realize constant PBYMIP(1,2) plateaus closer to test beam values.

- We are aiming at <5% precision. Can easily be accomplished by a few more iterations.

- For continuous updates:

  `http://www-cdf.lbl.gov/~pmf/Calorimeter/tune`